



HLA OMT Version 1.3 Fundamentals



Integrated Training Program

Defense Modeling & Simulation Office
(703) 998-0660 Fax (703) 998-0667
hla@msis.dmso.mil
<http://www.dmso.mil/>

Background

- **The formal definition of the HLA is composed of:**
 - **HLA Rules:** A set of rules which must be followed to achieve proper interaction of simulations in a federation execution. These describe the responsibilities of simulations and of the runtime infrastructure (RTI) in HLA federations
 - **HLA Interface Specification:** Definition of the interface functions between the RTI and simulations participating in HLA federations
 - **HLA Object Model Template:** Common presentation format for HLA Object Models

Object Models



- Object models provide an identification of the set of objects chosen to represent the “real world” for a specific application, including:
 - Object characteristics (attributes)
 - Static object relationships (class hierarchies)
 - Dynamic object relationships (interactions)
 - Individual object behavior

***Note: HLA Object View does not imply or require object-oriented implementation means**

HLA Object Models

Federation Object Model (FOM):

- A specification of the exchange of public data among the participants in a HLA federation
- Provides an information model view of the problem space (not all possible views)
- Includes ...
 - Object Classes
 - Object Interactions
 - Attributes
 - Parameters
 - Metadata/DDM
 - Lexicon

HLA Object Models

Simulation Object Model (SOM):

- A specification of the information types offered to federations by individual simulations
 - Same information categories as FOM
- Is not intended to fully describe the entity behaviors and capabilities represented by algorithms internal to the simulation
- Specifies both imported and exported data
- Provides means of judging suitability of simulation systems to participate in HLA federations

HLA Object Model Template

The HLA Object Model Template (OMT) is a standardized presentation format for describing HLA object models

Rationale:

- **Facilitates FOM development coordination**
- **Provides a common means of describing potential federation members**
- **Facilitates the design and development of common FOM development toolsets**

HLA Object Model Template

- OMT v0.1 Release - July, 1995
 - Baseline framework for FOM construction during HLA prototyping effort.
- OMT v1.0 Release - August, 1996
 - Incorporation of protofederation feedback. Consistency checking with Interface Specification. Reformatting/technical editing.
- OMT v1.1 Release - February, 1997
 - New appendix to specify base datatypes for attributes and parameters.
- OMT v1.2 Release - August, 1997
 - Redesigned Interaction Table (parameter inheritance), Split Attribute/Parameter Table into two separate tables.
- OMT v1.3 Release - February, 1998
 - Addition of Routing Space Table. Merging of OMT Extensions components. IEEE format.

OMT Components

- **Object Model Identification Table**
- **Object Class Structure Table**
- **Interaction Class Structure Table**
- **Attribute Table**
 - **Enumerated Datatype Table**
 - **Complex Datatype Table**
- **Parameter Table**
- **Routing Space Table**
- **FOM/SOM Lexicon**

Object Model Identification Table

Object Model Identification Table	
Category	Information
Name	
Version	
Date	
Purpose	
Application Domain	
Sponsor	
POC	
POC Organization	
POC Telephone	
POC Email	
Name	Strike Simulation SOM
Version	1.0 Alpha
Date	1 Jan 1998
Purpose	To provide an example of an object model for a federate that simulates strike operations.

Object Class Structure Table

Object Class Structure Table			
<class> (<ps>)	[<class> (<ps>)]	[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* [<ref>]
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* [<ref>]
	
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* [<ref>]
	[<class> (<ps>)]	[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* [<ref>]
	
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* [<ref>]
	
	Air Vehicle (S)	Fixed Wing (S)	F-14 (PS)
			F-16 (PS)
			F-18 (PS)
		Bomber (S)	B-1 (PS)
			B-2 (PS)
		Rotary Wing (PS)	

Interaction Class Structure Table

Interaction Class Structure Table			
<class> (<isr>)	[<class> (<isr>)]	[<class> (<isr>)]	[<class> (<isr>)] [,<class> (<isr>)]* [<ref>]
		[<class> (<isr>)]	[<class> (<isr>)] [,<class> (<isr>)]* [<ref>]
	
		[<class> (<isr>)]	[<class> (<isr>)] [,<class> (<isr>)]* [<ref>]
	[<class> (<isr>)]	[<class> (<isr>)]	[<class> (<isr>)] [,<class> (<isr>)]* [<ref>]
	
		[<class> (<isr>)]	[<class> (<isr>)] [,<class> (<isr>)]* [<ref>]

	Weapon Detonate (S)	Weapon Detonate at Sea Target (R)	Weapon Detonate at Cruiser (IR)
			Weapon Detonate at Carrier (IR)
			Weapon Detonate at Destroyer (IR)
		Weapon Detonate at Submarine (IR)	
		Weapon Detonate at Land Target (IR)	
		Weapon Detonate at Air Target (R)	Weapon Detonate at Fighter (IR)
			Weapon Detonate at Bomber (IR)

Attribute Table

Attribute Table													
Object	Attribute	Data-type	Cardi-nality	Units	Resolution	Accuracy	Accuracy Condition	Update Type	Update Condition	T/A	U/R	Routing Space	
<class>	<attribute>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate> <condition>	<ta>	<ur>	<r_space>	
	<attribute>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate> <condition>	<ta>	<ur>	<r_space>	
	
<class>	<attribute>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate> <condition>	<ta>	<ur>	<r_space>	
	<attribute>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate> <condition>	<ta>	<ur>	<r_space>	
	
Tank	Area	Float	1	m2	0.1	perfect	always	cond	scen events	TA	UR	N/A	
	Velocity	Double	1	m/sec	.01	.01	none	periodic	10 Hz	TA	UR	N/A	
	State	Tank_Type	1	n/a	n/a	n/a	n/a	cond	scen events	TA	UR	Location	
	Position	Rec_Type	1	n/a	n/a	n/a	n/a	periodic	10 Hz	TA	UR	Location	

Parameter Table

Parameter Table								
Interaction	Parameter	Data-type	Cardi-nality	Units	Resolution	Accuracy	Accuracy Condition	Routing Space
<interaction>	<parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<r_space>
	<parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	
	
<interaction>	<parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<r_space>
	
Weapon Detonate	Weapon Location	Rec_Type	1	N/A	N/A	N/A	N/A	N/A
	Warhead Size	Unsigned Short	1	lbs	1.0	perfect	always	
	Warhead Type	WH_Type	1	N/A	N/A	N/A	N/A	

Routing Space Table

Routing Space Table					
Routing Space	Dimension	Dimension Type	Dimension Range/Set	Range/Set Units	Normalization Function
<r_space>	<dimension>	<type>	<range/set>	<units>	<n_function>
	<dimension>	<type>	<range/set>	<units>	<n_function>
	<dimension>	<type>	<range/set>	<units>	<n_function>
...
<r_space>	<dimension>	<type>	<range/set>	<units>	<n_function>
	<dimension>	<type>	<range/set>	<units>	<n_function>
Location	X_dim	float	(0-100]	km	linear(X)
	Y_dim	float	(0-100]	km	linear(Y)

Related Documents

- **HLA FEDEP Model**: a description of the process used to build and execute HLA federations
- **HLA Object Model Development Process**: a more detailed description of the process used to develop HLA object models

DMSO Home Page — <http://www.dmso.mil/>